



001. The temporary hardness of water is due to what ?

- (A) Phosphate ions
(B) Chloride ions
(C) Bicarbonate ions
(D) Sulphate ions

002. An organic alcoholic compound reacts with $ZnCl_2$ and HCl to form an oily layer immediately. Which compound do you predict for this ?

- (A) 2-methyl-2-butanol
(B) pentan-2-ol
(C) 1-pentanol
(D) 3-methyl-2-butanol



003. Consider the Arrhenius equation given below and mark the correct option.
 $k = Ae^{-E_a/RT}$

- (A) Rate constant increases exponentially with decreasing activation energy and increasing temperature
(B) Rate constant decreases exponentially with increasing activation energy and decreasing temperature
(C) Rate constant increases exponentially with decreasing activation energy and decreasing temperature
(D) Rate constant increases exponentially with increasing activation energy and decreasing temperature

004. The enthalpies of elements in their standard states are taken as zero. The enthalpy of formation of a compound

- (A) is never negative
(B) is always zero
(C) is always negative
(D) may be positive or negative

005. What will be the pH range of the buffer solution prepared from citric acid and sodium citrate ?

- (A) 9.2 – 11.2
(B) 2.5 – 7.0
(C) 6.2 – 8.2
(D) 8.2 – 10.2

006. What is the order of a reaction between $KBrO_3$ and KI ?

- (A) Zeroth order
(B) 1st order
(C) 2nd order
(D) 3rd order

007. The measured absorbance of a solution with a path length of 1.00 cm is 0.544. If the concentration is 1.40×10^{-3} M, what is the molar absorptivity ($L \text{ Mol}^{-1} \text{ cm}^{-1}$) for this analyte ?

- (A) 38.9
(B) 389
(C) 3.89
(D) 0.389

CAI-B]

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[Contd...]



008. What is the alkalinity (mmol/L) of a water sample if 100.0 mL of water required 5.29 mL of 0.1028 M of HCl solution to reach a pH of 4.5 ?

(A) 5.146 (B) 514.591
(C) 5.44 (D) 0.00194

Handwritten notes: PHE - 2300, MHT 2021, 4.5

009. Which indicator is used in the complexometric titration to find out hardness of water in terms of Ca^{2+} and Mg^{2+} ions ?

(A) Phenolphthalein (B) Starch
(C) Eriochrome Black T (D) Muroxide

010. Which of the following catalyst is not used in the Kjeldahl method ?

(A) Copper sulphate (B) Potassium sulphate
(C) Selenium (D) Aluminium carbonate

011. Identify the levels that may arise from the configuration d^1 .

(A) $j = 3/2$ and $j = 3/2$ (B) $j = 5/2$ and $j = 1/2$
(C) $j = 5/2$ and $j = 3/2$ (D) $j = 1/2$ and $j = 3/2$

Handwritten notes: 440, 450, 3100, 5, 450, 22.4

012. What will be the moles of 5 g NaOH dissolved in 450 mL solution ? (atomic mass : Na = 23 g/mol, O = 16 g/mol, H = 1 g/mol)

(A) 2250 mol (B) 90 mol
(C) 0.011 mol (D) 0.125 mol

Handwritten notes: 5g NaOH, 450 mL, 22.4, 450, 0.125, 120

013. In the periodic table, electronegativity _____ across a period and _____ down a group.

(A) increases, decreases (B) decreases, increases
(C) decreases, decreases (D) increases, increases

014. H^+ and Li^+ are examples of _____ and H^- and CN^- are the examples of _____.

(A) soft acids, hard bases (B) hard acids, soft bases
(C) hard bases, soft acids (D) soft bases, hard acids

015. How many radial nodes to 3p and 3d orbitals have respectively ?

(A) 2 and 1 (B) 1 and 2
(C) 0 and 1 (D) 1 and 0

016. How much mg of copper will be required for the preparation of 500 mL of a 25 ppm copper solution from pure copper metal ?

(A) 1.25 gm (B) 12.5 mg
(C) 10.25 gm (D) 25 mg

CAI-B]

[3]

[P.T.O.]



017. બાળલગ્ન પ્રતિબંધક અધિનિયમ કયા વર્ષમાં ઘડવામાં આવ્યો ?

- (A) ૨૦૦૬ (B) ૨૦૦૭
(C) ૨૦૦૮ (D) ૨૦૦૯

018. ગુજરાત સરકારના સામાજિક ન્યાય અને અધિકારીતા વિભાગ દ્વારા અનુમૂલિત જાતિના દર્દીઓને કઈ યોજના અંતર્ગત ટીબી, કેન્સર, રક્તપિત જેવા રોગો માટે તબીબી સહાય આપવામાં આવે છે ?

- (A) મહાત્મા ફૂલે વૈદકીય સહાય
(B) ડૉ. સવિતા આંબેડકર વૈદકીય સહાય
(C) માઈ રમાબાઈ આંબેડકર વૈદકીય સહાય
(D) કુમાર રાજરત્ન ભીમરાવ આંબેડકર વૈદકીય સહાય

019. ભારતીય પુનઃવસન સંસ્થાનો ધારો કયા વર્ષમાં ઘડવામાં આવ્યો ?

- (A) ૧૯૯૭ (B) ૧૯૯૪
(C) ૧૯૯૫ (D) ૧૯૯૨

020. 7 વર્ષ પહેલા માતા અને પિતાની ઉંમરનો સરવાળો x વર્ષ હતો 5 વર્ષ પછી તેમનાં બે બાળકોની ઉંમરનો સરવાળો y વર્ષ થાય તો બધાની હાલની ઉંમરનો સરવાળો કેટલા વર્ષ થાય ?

- (A) $x + y - 4$ (B) $x + y + 10$
(C) $x + y + 4$ (D) $x + y + 14$

021. Which of the following is not the reducing agent ?

- (A) LiAlH_4
(B) Sodium borohydride
(C) Zinc amalgam
(D) Hydrogen peroxide

022. સામાન્ય રીતે કમ્પ્યુટરનું IP એડ્રેસ કેટલા બાઈટ્સનું હોય છે ?

- (A) 4 (B) 8
(C) 16 (D) 32

023. બારકોડ સ્કેનર કયા સ્વરૂપમાં પ્રિન્ટ કરેલાં બારકોડને વાંચે છે અને તેને અનુરૂપ ક્રિમતમાં ફેરવે છે ?

- (A) UPS (B) -USP
(C) UPC (D) UCP

CAI-B]

[4]

[Contd...



024. કમ્પ્યુટર સંબંધિત કોઈ કાર્ય કરવા માટે એક પછી એક કમ્પશ: સૂચનાઓની માર્ગદર્શિકા તૈયાર કરવામાં આવે છે તેને શું કહે છે ?
- (A) દસ્તાવેજ (B) વિધેય
(C) અલ્ગોરિધમ (D) સોફ્ટવેર
025. MS Word દસ્તાવેજમાં ઈન્ડેન્ટેશન એટલે કે લીટીના આરંભમાં જગ્યા છોડવા માટે કઈ કીનો ઉપયોગ કરવામાં આવે છે ?
- (A) ટેબ કી (B) ફંક્શન કી
(C) કંટ્રોલ કી (D) રિટર્ન કી
026. The intensity of electromagnetic radiation transmitted through a sample at a given wavenumber decreases exponentially with the sample thickness and the molar concentration. This is the _____ law.
- (A) Hooke (B) Beer-Lambert
(C) Gibbs-Helmholtz (D) Gibbs-Duhem
027. Select expression from the given options if you have been declared as the winner in the National beauty contest.
- (A) Bad luck (B) I am very sorry
(C) Happy journey (D) Oh ! I can't believe it
028. Fill in the blank :
Pointing to a shop at the end of the street, the father said to the children, "Let's go _____ to the ice-cream shop."
- (A) thither (B) wither
(C) their (D) here
029. Change the degree :
Rohit played the best.
- (A) Rohit played better than any other player.
(B) Very few players played as good as Rohit.
(C) No other player played as well as Rohit did.
(D) Some other players played as good as Rohit.
030. Change the voice :
He said, 'I shall go as soon as it is possible.'
- (A) He asked if he should go as soon as possible.
(B) He ordered me to go as soon as possible.
(C) He said that he would go as soon as it was possible.
(D) He suggested to go as soon as it was possible.

CAI-B]

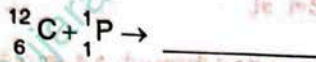
[5]

[P.T.O.]



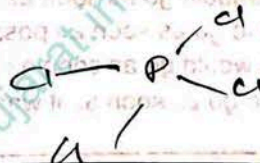
031. How the electron affinity of an element is largely determined ?
- (A) The energy of the lowest unfilled (or half-filled) orbital of the excited-state atom
- (B) The energy of the completely filled orbital of the excited-state atom
- (C) The energy of the lowest unfilled (or half-filled) orbital of the ground-state atom
- (D) The energy of the completely filled orbital of the ground-state atom

032. Complete the following reaction :



- (A) ${}_{7}^{13}\text{N} + \gamma$
- (B) ${}_{8}^{13}\text{O} + \gamma$
- (C) ${}_{7}^{13}\text{N} + \alpha$
- (D) ${}_{8}^{13}\text{O} + \beta$

033. The role of a catalyst is to change
- (A) Gibbs energy of reaction
- (B) Activation energy of reaction
- (C) Equilibrium constant
- (D) Enthalpy of reaction
034. Why excess addition of 6 N NH_4OH should be avoided in gravimetric analysis of aluminum ?
- (A) Because the precipitates are soluble in excess NH_4OH
- (B) Due to change in colour of the precipitates
- (C) Because it produces other salt due to post precipitation
- (D) Occlusion impurity occurs
035. Which of the following statement is wrong for EDTA ligand ?
- (A) It contains two nitrogen atoms, each with unshared pair of electrons
- (B) It is frequently symbolized by H_4Y
- (C) Its disodium salt can be represented by $\text{Na}_2\text{H}_2\text{Y}$
- (D) It is heptadentate ligand
036. What will be the shape of PCl_4^+ ion according to VSEPR theory ?
- (A) T_d
- (B) Oh
- (C) Square planar
- (D) Planar triangle



CAI-B]

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[Contd...



037. શબ્દસમૂહ માટે એક શબ્દનો સાચો વિકલ્પ પસંદ કરો.

બંને બાજુને જોડનારી

(A) બાજુબંધ

(C) ઉભયાન્વી

(B) દ્વિજોડાણ

(D) બેજોડ

038. સમાનાર્થી શબ્દ જણાવો.

'ઝલક'

(A) મંદ હસ્ય

(C) પાવન

(B) શ્રેષ્ઠતા

(D) તેજસ્વિતા

039. Give antonym of 'Innocent'.

(A) Humble

(B) Gentle

(C) Smooth

(D) Guilty

040. Give similar word of 'Modestly'.

(A) Harshly

(C) Humbly

(B) Roughly

(D) Humbly

041. _____, the reaction of diborane with alkenes in ether solvent, produces _____ that are useful intermediates in synthetic organic chemistry.

(A) Hydrogenation, organoboranes

(B) Halogenation, organoboranes

(C) Hydroboration, organoboranes

(D) Hydrogenation, organophosphorous

042. Which metals can be obtained from the minerals Magnetite and Chalcite respectively ?

(A) Fe, Cu

(C) Mg, Cu

(B) Fe, Ca

(D) Mg, Ca

043. Which of the following statement is not correct for an outer-sphere redox reaction which involves electron tunnelling between two reactants ?

(A) No major disturbance of their covalent bonding

(B) The rate constant depends on the electronic and geometrical structures of the reacting species

(C) The rate constant depends on the Gibbs energy of reaction

(D) Major change in the covalent bonding in the inner coordination spheres

CAI-B]

[7]

[P.T.O.]



044. Which of the following is the unit of rate constant of first order reaction ?

- (A) s^{-1} (B) $molL^{-1}s^{-1}$
(C) $mol^{-1}Ls^{-1}$ (D) $molLs$

045. Which of the following statement is correct for the colloids ?

- (A) A foam is a dispersion of a liquid in a gas
(B) A sol is a dispersion of a liquid in a solid
(C) An aerosol is a dispersion of a gas in liquid
(D) Lyophilic colloids are solvent attracting

046. In the case of octahedral molecule, for the $3d^4$ complexes, what will be the configurations in the weak-field ligands and strong-field ligands respectively ?

- (A) $t_{2g}^2e_g^2$ and $t_{2g}^3e_g^1$ (B) $t_{2g}^3e_g^1$ and $t_{2g}^4e_g^0$
(C) $t_{2g}^1e_g^3$ and $t_{2g}^0e_g^4$ (D) $t_{2g}^1e_g^3$ and $t_{2g}^1e_g^3$

047. Which of the following statement is not correct for the homogeneous catalysis ?

- (A) This includes acid and base catalysis
(B) This includes enzymes catalysts
(C) It involves solid and liquid phases
(D) Undergo no net chemical change

048. Which statement is wrong between adsorption and absorption ?

- (A) In absorption, the substance is concentrated penetrate in the bulk
(B) The term sorption is used to describe both the processes
(C) Both adsorption and absorption cannot take place simultaneously
(D) In adsorption, the substance is concentrated only at the surface

049. The molecular partition function factorizes into which of the following products ?

- i. Translation
ii. Rotational
iii. Vibrational
iv. Electronic

- (A) i and ii (B) i and iii
(C) ii and iv (D) All of the above

CAI-B]

[8]

[Contd...



050. Which of the following molecules can have pure rotational spectrum ?

- i. H_2
- ii. NO
- iii. N_2O
- iv. CH_4

- (A) i and ii
- (C) iii and iv

- (B) ii and iii
- (D) i and iv

051. The state of a gas can be described by quoting the relationship between

- (A) Pressure, volume, temperature
- (B) Pressure, volume, temperature, amount
- (C) Temperature, amount, pressure
- (D) Amount, volume, temperature

052. What will be the product for the chemical reaction $C_6H_6 + CH_3COCl$ (in the presence of anhydrous $AlCl_3$) \rightarrow _____ ?

- (A) C_6H_5Cl
- (C) $C_6H_5COCH_3$

- (B) C_6H_5COCl
- (D) $C_6H_5COCICH_3$

053. Which statement is correct for the Sandmeyer's reaction ?

- (A) Chlorobenzene can be converted into benzaldehyde
- (B) Benzaldehyde can be converted into benzoic acid
- (C) Chlorobenzene can be converted into benzoic acid
- (D) Aniline can be converted into chlorobenzene

054. The sharp melting point of crystalline solids is due to

- (A) Same arrangement of constituent particles in different directions
- (B) A regular arrangement of constituent particles observed over a long distance in the crystal lattice
- (C) Different arrangement of constituent particles in different directions
- (D) A regular arrangement of constituent particles observed over a short distance in the crystal lattice

055. Which compound is added prior to the addition of NH_4OH in the gravimetric analysis of Al ? Why ?

- (A) NH_4NO_3 , to increase NH_4^+ concentration
- (B) NH_4NO_3 , to increase NO_3^- concentration
- (C) NH_4Cl , to increase Cl^- concentration
- (D) NH_4Cl , to increase NH_4^+ concentration

CAI-B]

[9]

[P.T.O.]

056. What are the values of the Cartesian coordinates 'x' and 'y' in spherical polar coordinates ?

(A) $x = r \sin \theta \sin \phi$, $y = r \cos \theta$ (B) $x = r \sin \theta \sin \phi$, $y = r \sin \theta \cos \phi$
 (C) $x = r \cos \theta \cos \phi$, $y = r \sin \theta \sin \phi$ (D) $x = r \sin \theta \cos \phi$, $y = r \sin \theta \sin \phi$

057. સાચી જોડણી શોધો.

(A) મૂર્ધાલિચિત્ત (B) મૂર્ધાલિચિત્ત
 (C) મૂર્ધાલિચિત્ત (D) મુર્ધાલીચિત્ત

058. નીચે આપેલ વાક્યનું યોગ્ય પેરકવાક્ય જણાવો.
 મેં હાથમાં ધોકેણું લીધું.

(A) મારી પાસે હાથમાં ધોકેણું લેવડાવશે.
 (B) મારી પાસે હાથમાં ધોકેણું લેવડાવે છે.
 (C) મારી પાસે હાથમાં ધોકેણું લેવડાવ્યું.
 (D) મારાથી હાથમાં ધોકેણું લેવાયું.

059. અલંકારનો પ્રકાર વિકલ્પમાંથી શોધો.
 વિદ્યા ભણ્યો જેહ, તેહ ઘર વૈભવ ફડો.

(A) અંત્યાનુપ્રાસ (B) આંતરપ્રાસ
 (C) ઉપમા (D) સજ્જવારોપણ

060. નીચે આપેલ શબ્દોમાંથી કયો શબ્દ 'ગમખ્વાર' શબ્દનો સમાનાર્થી નથી તે જણાવો.

(A) સહનશીલ (B) ઉત્કટ
 (C) ધીરજ રાખનાર (D) દિલગીરી ભરેલ

061. In an adiabatic process, no transfer of heat takes place between system and surroundings. Choose the correct option for free expansion of an ideal gas under adiabatic condition from the following.

(A) $q \neq 0$, $\Delta T = 0$, $w = 0$ (B) $q = 0$, $\Delta T \neq 0$, $w = 0$
 (C) $q = 0$, $\Delta T < 0$, $w \neq 0$ (D) $q = 0$, $\Delta T = 0$, $w = 0$

062. Which of the following is not the limitation of the CFT ?

(A) It explains the covalent character of bonding between the ligand and the central atom in coordination compounds
 (B) It explains the formation of coordination compounds
 (C) It explains the structures of coordination compounds
 (D) It explains the colour and magnetic properties of coordination compounds

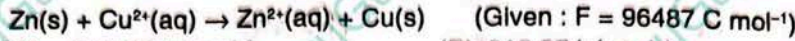
CAI-B]

[10]

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063. The standard electrode potential for Daniell cell is 1.1V. Calculate the standard Gibbs energy for the reaction.



(A) - 212.27 kJ mol⁻¹

(B) 212.27 kJ mol⁻¹

(C) - 112.27 kJ mol⁻¹

(D) 112.27 kJ mol⁻¹

$$E = -nF\Delta G$$

$$1.1 = -n \times 96487 \times \Delta G$$

064. In the periodic table, the s-block halides are predominantly _____ and the p-block halides are predominantly _____.

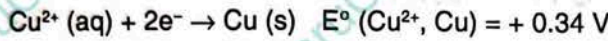
(A) covalent, ionic

(B) ionic, covalent

(C) covalent, covalent

(D) ionic, ionic

065. Use the following standard potentials to calculate the standard potential of a copper-zinc cell.



(A) + 0.42 V

(B) - 0.42 V

(C) - 1.10 V

(D) + 1.10 V

$$E = \frac{0.34 - (-0.76)}{2} = \frac{1.10}{2} = 0.55 \text{ V}$$

066. Arrange the following compounds in increasing order of their acid strength :

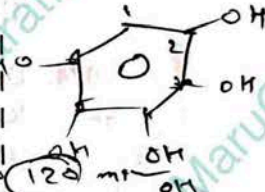
2,4,6-trinitrophenol, 3-nitrophenol, 3,5-dinitrophenol, phenol

(A) phenol, 3-nitrophenol, 3,5-dinitrophenol, 2,4,6-trinitrophenol

(B) 2,4,6-trinitrophenol, 3,5-dinitrophenol, 3-nitrophenol, phenol

(C) phenol, 2,4,6-trinitrophenol, 3,5-dinitrophenol, 3-nitrophenol

(D) 3-nitrophenol, phenol, 2,4,6-trinitrophenol, 3,5-dinitrophenol



067. બે સ્કુટર સમાન અંતર 60 km/hr અને 54 km/hr ની ઝડપે કાપે છે. લાગેલા સમયનો તફાવત 20 મીનીટ છે. અંતર શોધો.

(A) 114 km

(B) 150 km

(C) 180 km

(D) 205 km

$$\text{અંતર} = \frac{\text{સમય} \times \text{ઝડપ}}{2}$$

$$= \frac{120 \times 54}{2}$$

068. એક વેપારી પોતાના માલની પડતર કિંમત ઉપર 40% યડાવી કિંમત છાપે છે અને 25% વળતર આપે છે. વેપારીને ખરેખર કેટલા ટકા નફો થાય ?

(A) 15

(B) 10

(C) 7.5

(D) 5

$$\text{L.P.S } 40\%$$

$$25\% \text{ વળતર}$$

$$\frac{40}{100} \times 100 = 40$$

$$100 + 40 = 140$$

$$\frac{140}{100} \times 100 = 140$$

$$140 - 25 = 115$$

$$\frac{115}{100} \times 100 = 115$$

069. રૂઢિપ્રયોગનો સાચો અર્થ શોધો.

ગામનો ઉત્તાર હોવો

(A) બધાને બદનામ કરવું

(B) સૌથી ખરાબ માણસ હોવો

(C) સૌને સહાય કરવી

(D) સૌથી શ્રેષ્ઠ માણસ

CAI-B]

[11]

[P.T.O.]



070. નીચે આપેલ વાક્યનો નિષાત ઓળખાવો.
માતાજી, મિથુન ફક્ત દવા કરશે.

- (A) ની (B) ફક્ત
(C) (B) અને (D) બંને (D) જી

071. What is the role of cathode in an electrolytic cell ?

- (A) At which reduction occurs
(B) At which oxidation occurs
(C) At which reduction and oxidation both occurs
(D) At which no reaction occurs

072. What is the formula of the residue in the gravimetric analysis of Fe after igniting the precipitate in crucible ?

- (A) Fe_2O_4 (B) Fe_2O_3
(C) Fe_3O_4 (D) FeO

073. What are the number of protons, neutrons and electrons in $^{80}_{35}Br$ respectively ?

- (A) 35, 45, 35 (B) 35, 45, 80
(C) 45, 35, 45 (D) 80, 45, 35

074. During the filtration process in the gravimetric analysis which solution is used to avoid peptization in precipitate ?

- (A) NH_4Cl solution
(B) NH_4NO_3 solution
(C) NH_4SO_4 solution
(D) NH_4OH solution

075. In the gravimetric analysis of Ba^{2+} ions as $BaSO_4$, the precipitates is easily reduced to _____ at temperatures above $600^\circ C$ by carbon of the filter paper.

- (A) BaO (B) BaS
(C) $BaH_2(SO_4)_2$ (D) $BaSO_5$

076. What can be the probable hybridization for a molecule having trigonal bipyramidal arrangement ?

- (A) d^2sp^3 (B) sp^3d
(C) sp^3 (D) spd^2

[CAI-B]

[12]

[Contd...]



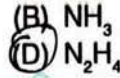
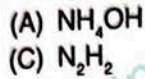
077. For variance F , the number of components C , and the number of phases at equilibrium P , then for any system of any composition, what is the phase rule ?

(A) $F = P - C + 1$
 (C) $F = P - C + 2$

(B) $F = C - P + 1$
 (D) $F = C - P + 2$

$F = p - c + 2$

078. What is the molecular formula of hydrazine ?



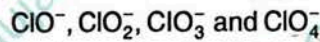
079. What is argentometric titration ?

- (A) It is the titrations with EDTA
 (B) It is the titrations with silver nitrate
 (C) It is the titrations with HCl
 (D) It is the titrations with sodium thiosulphate

080. What will be the nature of the water sample if it contains carbonate and bicarbonate ions present in it ?

- (A) Alkaline
 (B) Highly acidic
 (C) Neutral
 (D) None of the above

081. Which of the following species, do not show disproportionation reaction ?



- (A) ClO_4^-
 (C) ClO_2^-

- (B) ClO_3^-
 (D) ClO^-

082. MS Excel માં માઉસ વડે શીટનું નામ બદલવા માટે શીટ ટેબમાં ઉપલબ્ધ શીટના નામ પર કઈ ક્લિક કરવામાં આવે છે ?

- (A) સિંગલ ક્લિક
 (B) ડબલ ક્લિક
 (C) ટ્રિપલ ક્લિક
 (D) રાઈટ ક્લિક

083. કમ્પ્યુટરમાં ડેટા સ્ટોરેજ આધારિત નીચેના પૈકી સૌથી મોટો એકમ કયો છે ?

- (A) YT (Yotta Byte)
 (B) PB (Peta Byte)
 (C) ZB (Zetta Byte)
 (D) TB (Tera Byte)

084. પાઈમરી મેમરીને અન્ય કયા નામે ઓળખવામાં આવે છે ?

- (A) ગૌણ મેમરી, સ્થાયી મેમરી, નોનવોલેટાઈલ મેમરી
 (B) ગૌણ મેમરી, સ્થાયી મેમરી, ઓક્સિલરી મેમરી
 (C) મુખ્ય મેમરી, અસ્થાયી મેમરી, ઇન્ટરનલ મેમરી
 (D) મુખ્ય મેમરી, એક્સટર્નલ મેમરી, માસ્ટર મેમરી

CAI-B]

[13]

[P.T.O.]



085. પ્રાઈમરી પ્રોમરીની સરખામણીમાં સેકન્ડરી પ્રોમરી કેવી હોય છે ?
 (A) સ્થાયી, ધીમી, ઓછી પ્રચાલ (B) અસ્થાયી, ધીમી, ઓછી પ્રચાલ
 (C) સ્થાયી, ઝડપી, ઓછી પ્રચાલ (D) અસ્થાયી, ધીમી, વધુ પ્રચાલ
086. If we replace two hydrogen atoms in methane molecule by chlorine atoms, then what will be the point group of the new molecule ?
 (A) C_{4v} (B) C_{2v}
 (C) C_{3v} (D) Td
087. An organic compound is giving (i) violet colouration with ferric chloride test and (ii) yields crystalline bromination product with bromine water. What can be the function group present with the organic compound ?
 (A) carboxylic (B) phenolic
 (C) alcoholic (D) ester
088. What are the approximate wavelength (in nm) of violet and red respectively ?
 (A) 450 – 500, 570 – 590 (B) 570 – 590, 450 – 500
 (C) 400 – 450, 620 – 760 (D) 620 – 760, 400 – 450
089. Ionic radii _____ down a group and the radii of ions of the same charge _____ across a period.
 (A) increase, increase (B) decrease, decrease
 (C) decrease, increase (D) increase, decrease
090. Which indicator is used in the Volhard method ?
 (A) Salt of Barium (II) (B) Salt of Aluminium (III)
 (C) Salt of Magnesium (II) (D) Salt of Iron (III)
091. Which of the following statement is not correct for the vibrations to be Raman active ?
 (A) The specific selection rule is $\Delta v = \pm 2$
 (B) The polarizability must change as the molecule vibrates
 (C) In gas-phase spectra, the stokes and anti-stokes have a branch structure
 (D) None of the above
092. નીચે આપેલ તળપદા શબ્દનું શિષ્ટ રૂપ વિકલ્પમાંથી શોધો.
 'લોલ'
 (A) ચોક (B) ચંચળ
 (C) હાલરડ (D) અશોભનીય

CAI-B]

[14]

[Contd...



093. નીચે દર્શાવેલ જોડકાં યોગ્ય રીતે જોડો.

- | | |
|-------------------|--------------|
| a. અખો | 1. શિવપુરાણ |
| b. નર્મદ | 2. ગોવિંદગમન |
| c. રામનારાયણ પાઠક | 3. કવિચરિત્ર |
| d. શામળ | 4. સાખીઓ |
| e. સ્વામી આનંદ | 5. ઈશોપનિષદ |

(A) a-4, d-1, b-3, c-2, e-5 ✓

(B) c-2, d-1, b-3, e-4, a-5 ✓

(C) e-4, a-3, c-2, d-1, b-5

(D) d-4, e-5, a-1, b-3, c-2

094. રઘુવીર ચૌધરીની કૃતિ જણાવો.

(A) મેળવણ

(C) અનુરાગ

(B) સ્વચ્છંદ

(D) આવરણ

095. 'ભદ્રંભદ્ર' ના સર્જક રમણભાઈ નીલકંઠનું જન્મસ્થળ જણાવો.

(A) અમદાવાદ

(C) વડોદરા

(B) નડિયાદ

(D) સુરત

096. The trainee operator carried out six determinations yielding a mean of 35.25% with a standard deviation of 0.34%. The experienced operator obtained a mean of 35.35% and a standard deviation of 0.25% from five determinations. Calculate the F_{cal} value.

(A) 0.735

(C) 1.85

(B) 0.540

(D) 1.36

097. Natural rubber may be considered as a linear polymer of

(A) 1-methyl-1, 3-butadiene

(C) 2-ethyl-1, 3-butadiene

(B) 2-methyl-1, 3-butadiene

(D) 1-ethyl-1, 3-butadiene

098. Aliphatic and aromatic primary amines on heating with chloroform and ethanolic potassium hydroxide form _____ or _____.

(A) isocyanide, carbylamine

(C) cyanide, carboxylic acid

(B) cyanide, carbylamines

(D) isocyanate, isocyanide

099. What is the type of the volumetric analysis to determine % of H_2O_2 using sodium thiosulphate solution ?

(A) Complexometric

(C) Iodimetric

(B) Iodometric

(D) Acid-base

CAI-B]

[15]

[P.T.O.]



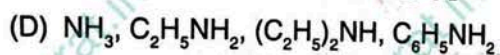
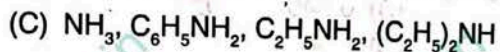
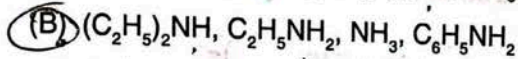
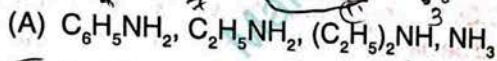
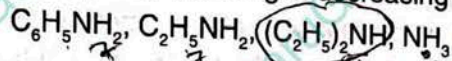
100. Why KBr pellet technique is used in the IR spectroscopy ?
- (A) It has property of being able to squeezed under very high pressure into transparent disc
- (B) When mixed with the sample, under very high pressure, the sample becomes transparent
- (C) When mixed with the sample, under very high pressure, KBr and the sample both becomes transparent
- (D) None of the above



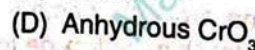
101. What is the molecular formula of styrene ?
- (A) $C_6H_5CH = CH_2$
- (B) $C_6H_5CH_2CH_3$
- (C) $C_6H_5CH_3$
- (D) $C_6H_5CH_2CH = CH_2$

102. Which statement is wrong for the zwitter ion ?
- (A) It is also known as amino acid ✓
- (B) It shows amphoteric ✓
- (C) It contains both positive and negative charges ✗
- (D) They are linked by carbon-carbon bond ✓

103. Arrange the following in decreasing order of their basic strength.



104. What is the name of the reagent to bring about the transformation of cyclohexanol to cyclohexanone ?



105. Which of the following is not commonly used as a reference electrode in a potentiometric titration ?

(A) Indicator electrode

(B) Calomel

(C) Silver-silver electrode

(D) None of the above

CAI-B]

[16]

[Contd...]



106. What is the colour change of a solution when Fe^{2+} ions converted to Fe^{3+} ions ?

- (A) Green to yellow
 (B) Yellow to green
 (C) Green to red
 (D) Yellow to red

107. Which of the following reaction is pseudohalogen reaction in the gas phase ?

- (A) $\text{H}_2 + \text{C}_2\text{H}_2 \xrightarrow{h\nu} 2 \text{CH}_2$
 (B) $\text{H}_2\text{O} + \text{C}_2\text{H}_6 \xrightarrow{h\nu} \text{C}_2\text{H}_5\text{OH} + \text{H}_2$ ✗
 (C) $\text{H}_2 + \text{C}_2\text{H}_4 \xrightarrow{h\nu} \text{C}_2\text{H}_6$
 (D) $\text{H}_2 + \text{C}_2\text{N}_2 \xrightarrow{h\nu} 2 \text{HCN}$ ✓

108. Which of the following transitions are not allowed according to Laporte selection rule in a centrosymmetric molecule or ion ?

1. $g \rightarrow g$
 2. $g \rightarrow u$
 3. $u \rightarrow u$
 4. $u \rightarrow g$

- (A) 1 and 2
 (C) 2 and 3

- (B) 1 and 3
 (D) 2 and 4

109. Which of the following statement is wrong for the stepwise polymerization ?

- (A) It commonly proceeds via condensation process
 (B) Any two monomers in a reaction can link together
 (C) Generally elimination of some small molecules like H_2O does not occur during the reaction
 (D) Nylon-66 can be prepared by this method ✓

110. An element has a body-centred cubic (bcc) structure with a cell edge of 288 pm. The density of the element is 7.2 g/cm^3 . How many atoms are present in 208 g of the element ?

- (A) $2.39 \times 10^{-23} \text{ cm}^2$
 (C) $2.39 \times 10^{-23} \text{ cm}$
- (B) $2.39 \times 10^{-23} \text{ cm}^3$
 (D) $2.39 \times 10^{-23} \text{ cm}^{-3}$ ✓

CAI-B]

[17]

[P.T.O.]



111. What is the structure of Rock salt (NaCl) ?
 (A) Half tetrahedral (B) Half octahedral
 (C) All octahedral (D) All tetrahedral
112. ભારતીય બંધારણના કયા સુધારા અંતર્ગત પુખ્તવયના મતાધિકાર સંબંધે મતદાતાની વયમર્યાદા ૨૧ વર્ષથી ઘટાડીને ૧૮ વર્ષ કરવામાં આવી ?
 (A) ૪૭ મો સુધારો (B) ૬૧ મો સુધારો
 (C) ૫૨ મો સુધારો (D) ૫૭ મો સુધારો
113. 'દરેક રાજ્યનું એક વિધાનમંડળ રહેશે.' ભારતીય સંવિધાનમાં આ જોગવાઈ બાબતનો આર્ટિકલ જણાવો.
 (A) આર્ટિકલ - ૧૫૩ (B) આર્ટિકલ - ૧૪૭
 (C) આર્ટિકલ - ૧૭૫ (D) આર્ટિકલ - ૧૬૮
114. ગાંધીજીની કાકા સાહેબ કાલેલકર સાથે પ્રથમ મુલાકાત ક્યાં થઈ ?
 (A) ધરાસણા સત્યાગ્રહ દરમ્યાન (B) શાંતિનિકેતન આશ્રમમાં
 (C) ચંપારણ સત્યાગ્રહ દરમ્યાન (D) કોચરબ આશ્રમમાં
115. નીચે દર્શાવેલ જોડકાં યોગ્ય રીતે જોડો.
 a. દાદા હરિરની વાવ ————— 1. અમદાવાદ જિલ્લો
 b. અડી-કડીની વાવ ————— 2. સાબરકાંઠા જિલ્લો
 c. અડાલજની વાવ ————— 3. જુનાગઢ જિલ્લો
 d. બ્રહ્મજીની વાવ ————— 4. ગાંધીનગર જિલ્લો
 (A) c-3, d-2, b-4, a-1 (B) d-2, a-1, c-4, b-3
 (C) a-1, d-4, c-2, b-3 (D) a-3, b-1, c-4, d-2
116. The entropy change can be calculated by using the expression $\Delta S = q_{rev}/T$. When water freezes in a glass beaker, choose the correct statement amongst the following.
 (A) ΔS (system) increases but ΔS (surroundings) decreases
 (B) ΔS (system) decreases but ΔS (surroundings) increases
 (C) ΔS (system) decreases but ΔS (surroundings) remains the same
 (D) ΔS (system) decreases and ΔS (surroundings) also decreases
117. વાતાવરણની સ્તરરચના અન્વયે પૃથ્વીની સપાટીથી ઊંચે જતા અનુભવાતા તાપમાનના ફેરફારને કારણે વાતાવરણના ચાર આવરણો પાડવામાં આવ્યા છે. જેમાં નીચે દર્શાવેલ કયા આવરણનો સમાવેશ થતો નથી ?
 (A) ક્ષોભ આવરણ (B) મધ્યાવરણ
 (C) શીતાવરણ (D) ઉષ્માવરણ

CAI-B]

[18]

[Contd...]



118. સૂર્યઘાત માપવા માટે કયા સાધનનો ઉપયોગ થાય છે ?
 (A) ટેમ્પરનોમિટર (B) પાયરોનોમિટર
 (C) સનેરોમિટર (D) સિક્વેલોમિટર
119. પરાવર્તિત સૂર્યઘાતના જથ્થાને પૃથ્વીનો શું કહેવામાં આવે છે ?
 (A) સીક્વલ (B) આલ્બેડો
 (C) ન્યુડલ (D) ઇક્વેડો
120. પૃથ્વીની સપાટીથી જેમ જેમ ઊંચે જઈએ તેમ તેમ તાપમાન ઘટે છે. એક કિ.મી.ની ઉંચાઈએ જતા સામાન્ય રીતે કેટલું તાપમાન ઘટે છે ?
 (A) ૫° સે. (B) ૧૦° સે.
 (C) ૧૨° સે. (D) ૬.૫° સે.
121. Which set of orbitals is defined by $n = 4$ and $l = 1$? How many orbitals are there in this set ?
 (A) 3d, five (B) 3p, three
 (C) 4d, five (D) 4p, three
122. નીચે આપેલા અર્થલેદ : શબ્દલેદમાંથી ખોટો વિકલ્પ શોધો.
 (A) નશો - કેફ (B) નસો - પરિચારિકા
 (C) ભવન - ગૃહ (D) ભુવન - જગત
123. નીચે આપેલ શબ્દનો સાચો વિરોધી શબ્દ વિકલ્પમાંથી શોધો.
 નિગમ
 (A) ગમ ✓ (B) અગમ ✗
 (C) સગમ (D) જગમ ✗
124. નીચે આપેલ વાક્યનો યોગ્ય કર્તરિપ્રયોગ જણાવો.
 એમનાથી બીજા ઘણાં પ્રશ્નો ચર્ચાયા.
 (A) એમણે બીજા ઘણાં પ્રશ્નો ચર્ચ્યા. (B) એ બીજા ઘણા પ્રશ્નો ચર્ચે છે.
 (C) એમણે બીજા ઘણાં પ્રશ્નો ચર્ચાવશે. (D) એ બીજાથી ઘણાં પ્રશ્નો ચર્ચે છે.
125. નીચે આપેલ વાક્યનો કર્મણિપ્રયોગનો સાચો વિકલ્પ શોધો.
 વિનુ ઓફિસેથી આવ્યો હતો -
 (A) વિનુથી ઓફિસેથી અવાય છે (B) વિનુથી ઓફિસેથી અવાશે
 (C) વિનુથી ઓફિસેથી અવાયું હતું (D) વિનુથી ઓફિસેથી આવે છે



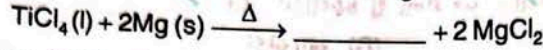
126. What is the molarity of a solution prepared by diluting 10.00 mL of a 4.281 M solution to 50.00 mL ?

- (A) 0.8562 M
(B) 0.0856 M
(C) 0.008562 M
(D) 2.1405 M

$$10 \text{ ml} \times 4.281 \text{ M} = 50 \text{ ml} \times M$$

$$M = \frac{10 \times 4.281}{50} = 0.8562 \text{ M}$$

127. Identify the product in the following 'Metal displacement' reaction:



- (A) $\text{Ti}^{4+}(\text{aq})$
(B) $\text{Ti}^{3+}(\text{aq})$
(C) $\text{Ti}^{2+}(\text{aq})$
(D) Ti (s)

$$50 \times 0.4281 = 21.405$$

$$21.405 \times 2 = 42.81$$

128. Proteins and nylon 6, 6 are the examples of _____ and _____.

- (A) synthetic, synthetic
(B) natural, natural
(C) synthetic, natural
(D) natural, synthetic

129. What will be the product when glucose gets oxidised with a mild oxidising agent like bromine water ?

- (A) malonic acid
(B) gluconic acid
(C) succinic acid
(D) glutaric acid

130. Predict the products of the two step reaction respectively :



- (A) 3-Hydroxybutanal, But-2-enal
(B) 4-Hydroxybutanal, But-3-enal
(C) 3-Hydroxybutanal, 4-Methylpent-3-en-2-one
(D) 4-Hydroxy-4-methylpentan-2-one, 4-Methylpent-3-en-2-one

131. Which is not the correct answer for the 'Calcification' which occurs during the extraction of crude metal from concentrated ore ?

- (A) It involves heating the ores
(B) It removes the volatile matter
(C) It involves the reduction of the oxide to metal
(D) It forms the metal oxide

132. અભસિયાનું વૈજ્ઞાનિક નામ શું છે ?

- (A) ટાઇગ્રીના ✗
(B) પેરિપ્લેનેટા અમેરિકાના ✗
(C) ફેરિટિમા પોસ્થુમા
(D) પેરેન્કાયમ્યુલા

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[Contd...]



133. નીચે દર્શાવેલ જોડકાં યોગ્ય રીતે જોડો.

- | | |
|----------------------------|----------------------|
| a. લોલકના નિયમો | 1. રોન્ટજન |
| b. પ્રોટોન ટ્રાન્સફર થીયરી | 2. ગેલેલિયો |
| c. રૂધિર જૂથના શોધક | 3. લોરી-બ્રોન્સ્ટેડ |
| d. ક્ષ-કિરણોના શોધક | 4. કાર્લ લેન્ડસ્ટીનર |

- (A) d-1, c-3, a-4, b-2
 (B) a-2, c-4, d-1, b-3
 (C) c-3, d-2, a-1, b-4
 (D) a-3, b-4, c-2, d-1

134. ખાલી જગ્યા પૂરો.

તાપમાનના એકમોના રૂપાંતરણ સૂત્ર -

$R = \frac{5}{9} \times C$ જ્યાં R = રૂમર (Reaumur), C = સેલ્સિયસ (Celsius)

- (A) $\frac{3}{4}$ (B) $\frac{4}{5}$
 (C) $\frac{2}{5}$ (D) $\frac{5}{4}$

135. ફ્લોના રસ અને જામમાં પ્રિઝવેટિવ તરીકે નીચેના પૈકી કયો વાયુ ઉપયોગમાં લેવાય છે ?

- (A) NH_3 (B) SO_2
 (C) H_2 (D) CO_2

136. The outermost electron configurations of Fe(0) and Fe(II) are $4s^23d^6$ and $3d^6$ respectively. The s-electron density at the nucleus is _____ in Fe (II) compared with Fe (0), producing a _____ in Mössbauer spectrum.

- (A) increased, large negative isomer shift
 (B) reduced, large negative isomer shift
 (C) increased, large positive isomer shift
 (D) reduced, large positive isomer shift

137. Change the gender of :

'Wizard'

- (A) Witch (B) Wizerdess
 (C) Wizardy (D) Wizardes

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[P.T.O.]



138. Give antonym of :
'Plaintiff'

- (A) Complainant (B) Suer
(C) Accused (D) Defendant

139. Give synonym of :
'Benevolent'

- (A) Beneficial (B) Indolent
(C) Kind (D) Moderate

140. Fill in the blank :

His cattle _____ in his back yard then.

- (A) is (B) are
(C) was (D) were

141. What is the inverse symmetry element of C_3^1 symmetry operation in ammonia molecule ?

- (A) C_3^1 (B) C_3^2
(C) i (D) E

142. નીચે જણાવેલ શબ્દનો અર્થ (શબ્દ-સમજૂતી) દર્શાવો.
'કમખો'

- (A) મોટી ચોળી (B) કસવાળું કપડું
(C) ધરાસે (D) મુલાયમ વસ્ત્ર

143. નીચે દર્શાવેલ જોડકાં યોગ્ય રીતે જોડો.

- | | |
|-----------|---------------------|
| a. ખટકર્મ | 1. અવ્યવીભાવ સમાસ |
| b. દરરોજ | 2. કર્મધારય સમાસ |
| c. નરહરિ | 3. તત્પુરુષ સમાસ |
| d. પદત્રણ | 4. દ્વિગુ સમાસ |
| e. પળવાર | 5. મધ્યમપદલોપી સમાસ |

- (A) a-4, c-5, e-1, b-2, d-3
(B) d-3, c-2, b-1, e-5, a-4
(C) d-3, b-1, e-2, a-5, c-4
(D) c-5, a-4, d-3, b-1, e-2

144. સ્ત્રગ્ધરા છંદનું બંધારણ જણાવો.

- (A) મરનાલયયય (B) મરભનયયય
(C) મરભયયયન (D) મરયયયભન

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[Contd...



145. નીચે આપેલ તળપદા શબ્દનું શિષ્ટ રૂપ વિકલ્પમાંથી શોધો.

'પરથમી'

(A) પ્રથમ પછીનું

(C) પારકું

(B) પૃથ્વી

(D) ઓળંગેલું

146. What is the gravimetric factor if a weight of Cl is to be determined from the weight of $PbCl_2$?

(Given : Atomic mass : Cl = 35.4527 and Pb = 207.1946)

(A) - 0.2550

(B) - 0.1278

(C) 0.1278

(D) 0.2550

147. બ્રિટીશ સરકારે ગાંધીજીને એમની માનવસેવા પ્રવૃત્તિઓને લક્ષ્યમાં લઈ કયો ઈલકાબ આપ્યો હતો ?

(A) હિંદનો ફકીર

(B) કેસરે હિંદ

(C) નિશાને હિંદ

(D) હિંદ મહાત્મા

148. નીચે દર્શાવેલ જોડકાં યોગ્ય રીતે જોડો.

a. ઘેડનો મેળો

1. સમી

b. વરાણા (વરણા) નો મેળો

2. લખપત

c. મેકરણનો મેળો

3. અલોદ

d. ચૂલનો મેળો

4. ખોરબંદર

(A) d-2, c-3, b-1, a-4

(B) d-3, a-2, b-1, c-4

(C) c-2, a-1, d-3, b-4

(D) a-4, b-1, d-3, c-2

149. 'અનટુ ધિસ લાસ્ટ' પુસ્તક દ્વારા ગાંધીજીના જીવનમાં અદ્વિતિય વિચારોનું નિર્માણ કર્યું. આ પુસ્તકના લેખકનું નામ જણાવો.

(A) ફેડલ રાફ્ટ

(B) પીટર્સ ટોલ્સટોય

(C) પીટ્સબર્ગ

(D) રસ્કિન

150. તત્વનાં તટસ્થ પરમાણુમાં કયા બે કણોની સંખ્યા હંમેશા સરખી હોય છે ?

(A) પ્રોટોન અને ન્યુટ્રોન

(B) ન્યુટ્રોન અને ઇલેક્ટ્રોન

(C) પ્રોટોન અને ઇલેક્ટ્રોન

(D) પ્રોટોન અને ન્યુક્લિઓન્સ

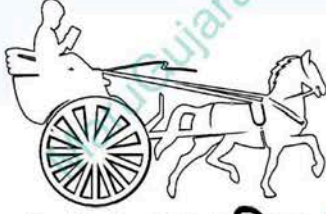
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[P.T.O.]

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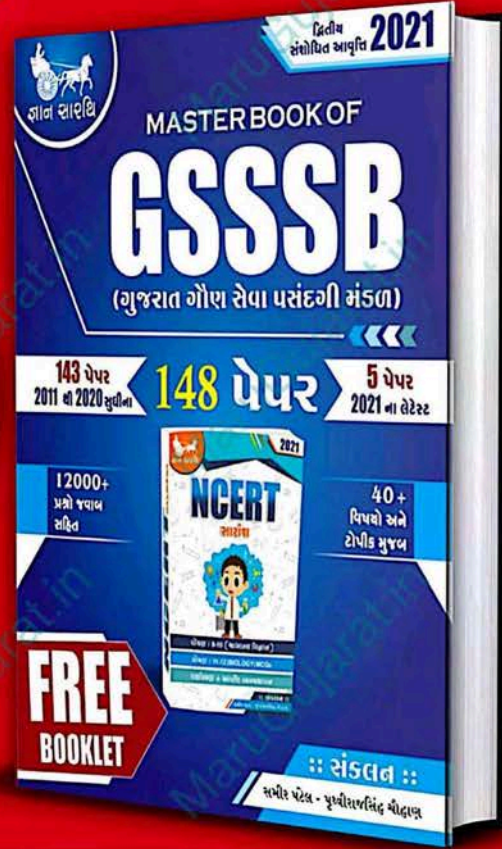
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